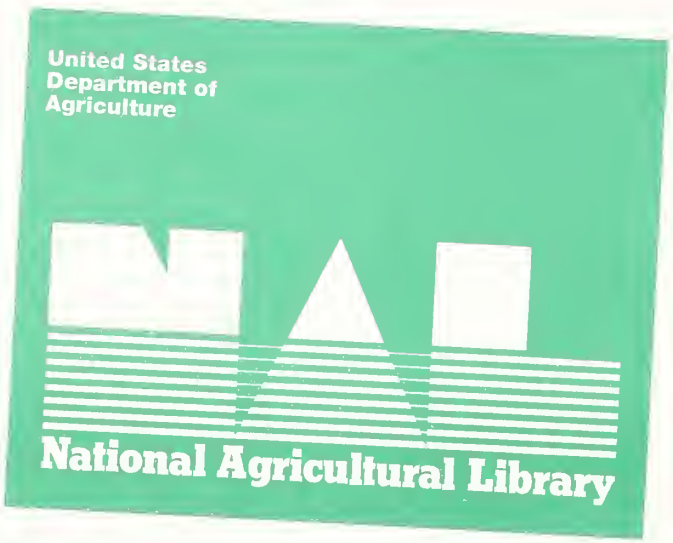
. S. D. A. STUDY
the
SUSQUEHANNA
RIVER
BASIN

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE



ACKNOWLEDGEMENT

Some of the pictures appear in this publication through the courtesy of

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U. S. Forest Service

FOREWORD

The U.S. Department of Agriculture has been engaged in river basin studies for three decades. In recent years, however, the Department of Agriculture has been given additional responsibilities in the development of comprehensive river basin plans.

This pamphlet is intended to describe briefly the Department's role in the coordinated study on the Susquehanna River Basin being carried out by the various federal agencies and the three states concerned. It outlines the objectives of the study and provides certain information on the Basin's resources and gives both general and specific information on the coordinated studies now underway.

U.S. DEPARTMENT OF AGRICULTURE
FIELD ADVISORY COMMITTEE

Ivan McKeever, Chairman, *Soil Conservation Service*

Frank Paradise, *Forest Service*

Wayne Ehlers, *Economic Research Service*

July 1965

INTRODUCTION

Objective

The objective of the Susquehanna River Basin study is the development of a comprehensive and coordinated plan which will serve as a blueprint for the optimum development of the water and related land resources of the Basin.

This plan will assure that the conservation, development and utilization of the water, land and related resources are directed to meet immediate needs and projected requirements for the next 50 years.

It will guide the use of these resources so that they make the maximum contribution to the economic growth of the Basin, adjacent areas, and the nation.

Coordinated Plan

In the past, measures taken to utilize and control the water resources of the Susquehanna River Basin have been on a basis of solving individual problems. This piecemeal approach to resource development is incompatible with today's rapidly growing population and the attending pressures toward more efficient utilization of these resources.

A coordinated plan for the development of the water and related land resources is being developed on a partnership basis between the states of New York, Pennsylvania, and Maryland and agencies of the federal government. The federal agencies are the Department of Agriculture; Department of Commerce; Corps of Engineers; Federal Power Commission; Department of Health, Education, and Welfare; Housing and Home Finance Agency; and Department of the Interior.

U.S.D.A. Responsibilities

Agencies within the U.S. Department of Agriculture actively participating in the study are the Soil Conservation Service, Forest Service, and the Economic Research Service. Other agencies in the Department are being consulted. The Department has major responsibilities in the study of the tributary watersheds of the Basin. These include a determination of future agricultural and nonagricultural needs and requirements for water and land in upstream areas, an inventory of all agricultural floodwater damages and urban floodwater damages in upstream areas, and location of feasible water storage sites for flood prevention, water supply, low flow augmentation, and recreational development.

Timetable

The study, which was authorized in October 1961, is well under way.

All of the agencies participating in the study have coordinated their schedules so that they will be in position to begin program formulation in July 1966. At that time the problems and needs will be delineated and solutions to resolve the problems and meet the needs will be proposed.

These studies will be used in preparing the coordinated plan which will be completed in 1969.


Elmira
Binghamton
NEW YORK
PENNSYLVANIA
Wilkes–Barre
Scranton
Williamsport
Susquehanna River
Sunbury
Altoona
Harrisburg
PENNSYLVANIA
MARYLAND
Baltimore

THE BASIN

The Susquehanna River begins at Lake Otsego, near Cooperstown, New York, in its 450-mile journey to the Chesapeake Bay. It has a drainage area of 27,510 square miles, and is the nation's largest river emptying into the Atlantic Ocean. It contains rich farmlands, vast woodlands, areas of vigorous economy and other areas where the economy is depressed as a result of technological changes.

NEW YORK

Twenty-three percent (6,308 square miles) of the Basin is in New York. This area covers parts of nineteen counties and has a population of 800,000.

Industry is concentrated in the Binghamton, Elmira, and Corning areas. Manufacturing employment is important in the leather, electrical equipment, machinery, and glass industries.

Annual income, which is related to sales and to the volume of manufacturing, mining and agricultural activity, is approximately $1\frac{1}{2}$ billion dollars.

PENNSYLVANIA

Seventy-six percent (20,928 square miles) of the Basin is in Pennsylvania. This area covers all or parts of 43 counties and has a population of 2,400,000.

Major industrial areas include the Wilkes-Barre - Scranton area, the Harrisburg-Lancaster-York triangle, and the Altoona and Williamsport areas.

Economic activity is varied. Mining is important in the Wilkes-Barre and Clearfield areas. Agriculture is important in the south and central counties. Manufacturing industries, including primary metals, paper, chemicals, apparel, glass, and electrical and transportation equipment are located throughout the Basin.

Annual income is approximately 5 billion dollars.

MARYLAND

The river empties into the Chesapeake Bay at Havre de Grace. Its influence on the Bay extends below Baltimore.

Although only one percent (274 square miles) of the Basin is in Maryland, the river is important to the economy of a much larger area.

Since Baltimore depends on the river to help meet its water supply needs, it is included in the Basin's service area. This area covers parts of four counties and has a population of 1,900,000. It is the fastest growing area in the Basin.

Manufacturing includes primary metals, transportation equipment and furniture. Annual income is approximately $3\frac{1}{2}$ billion dollars.


NEW YORK
PENNSYLVANIA
PENNSYLVANIA
MARYLAND

PEOPLE

The people living in the Basin must have an understanding of the study which is under way so that they can participate in the study, assist in the planning for water and related land resource development, and be fully aware of decisions which they will have to make toward the implementation of the comprehensive Basin plan.

Population trends in the last decade are indicated in the following table.

	1950	1960
North Branch		
New York	483,000	542,000
Pennsylvania	956,000	881,000
West Branch	361,000	380,000
Juniata Branch	239,000	237,000
Main Stem	911,000	1,082,000
TOTAL	2,950,000	3,122,000

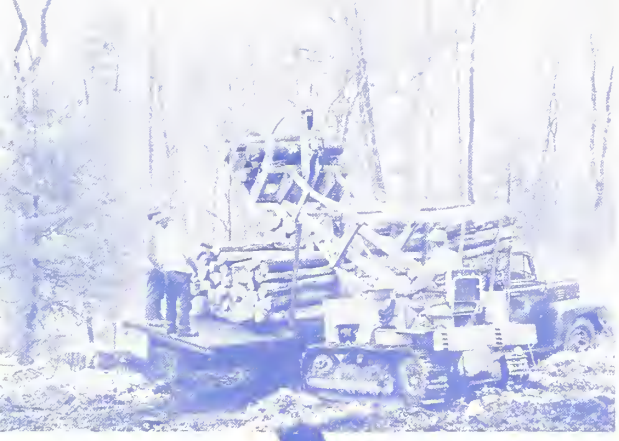
The counties bordering the main stem show population increases higher than the average eight percent gain for Pennsylvania as a whole. On the other hand, the Juniata Basin area shows a net loss in population while the West Branch counties had a six percent population gain, with much of this gain attributed to Centre County.

The North Branch as a whole suffered a loss of nearly 20 percent with major declines in the three most populous counties - Lackawanna, Luzerne, and Northumberland. The part of the Basin in New York had a 17 percent gain which was greater than the gain experienced for New York as a whole.

The factors behind these population changes are due to the decline in coal mining and railroad activity in many areas of Pennsylvania. The prosperous agricultural areas and diversified industry in southern Pennsylvania contribute to the large population gains in that portion of the Basin. The growth of industrial activity in the Binghamton area is responsible for the population gains in the New York portion of the Basin.

Optimum development of the water and related land resources in the Basin can have a dramatic effect on present population projections. There will be an ever-widening range of choices for locating future industries. People making these decisions will lean more and more toward selecting those areas that have pleasant climates, attractive recreational facilities, and other amenities of modern civilization.

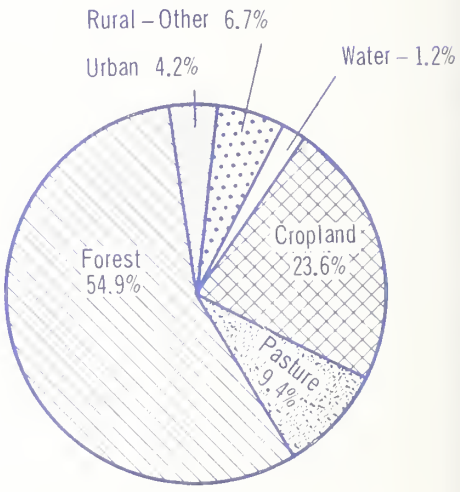
Proper planning, management and development of the Basin's resources can play an important role in the Basin's economic growth.



NEW YORK
PENNSYLVANIA

PENNSYLVANIA
MARYLAND

LAND USE



AGRICULTURE

The Basin can be divided into three general areas from an agricultural point of view. The lower part of the Basin contains some of the best farmland in the nation and contains a greater percentage of land in farms than any other portion of the Basin. The ridge and valley areas in the middle of the Basin consist of alternate mountain areas with fertile limestone valleys. The upper portion of the Basin has few areas of soils which will support a productive agricultural economy. This is evidenced by the abandonment of farms and the decline in farm income.

NEW YORK

The 10,000 farms in the Basin have annual sales of about $95,000,000 with 86 percent of this value derived from the sale of milk products. Other major agricultural production includes sale of cattle, poultry, and vegetables.

The number of upland farms has shown a rapid decline in recent years.

PENNSYLVANIA

The Basin contains about one-half of the farmland of the state.

The 48,000 farms produce a variety of products with dairying predominant in the north and central portions while livestock, poultry, tobacco, and vegetables, together with dairying, are significant in the southern portion. These farms are responsible for sales of about $380,000,000 with milk products, poultry, and livestock responsible for 70 percent of total sales.

Lancaster County ranks 13th in the nation in agricultural cash receipts and is ranked first of the counties not dependent on irrigation.

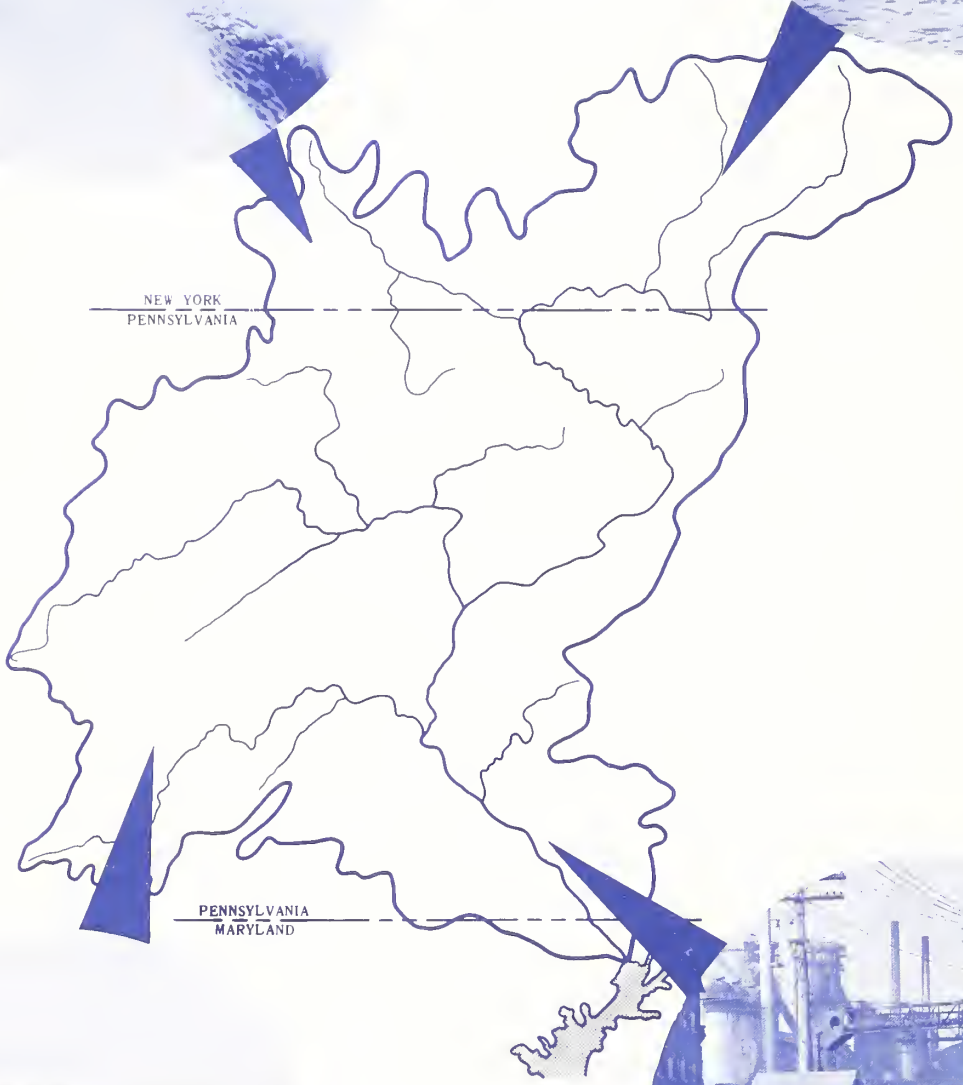
Pennsylvania ranks fourth in the country in peach production and sixth in apple production. The majority of this production comes from the orchards of Adams, Cumberland, Franklin, and York counties which are located in the southern portion of the Basin.

MARYLAND

There are less than 2,000 farms in the Basin with agricultural production valued at $16,000,000.

Encroachment of urban development has affected farm values. The average value is more than double those in New York and Pennsylvania.

Projections indicate farming enterprises will become even less significant in the future.


NEW YORK
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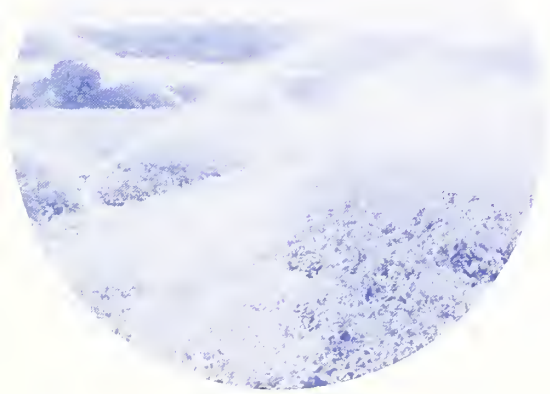
PENNSYLVANIA
MARYLAND



WATER

The Basin has enough water to meet the needs far into the future, but it has to be managed so it is available in the right place, at the right time, in the right quantity, and with the desired quality.

NEW YORK

Water usage is approximately 100 million gallons per day with the majority coming from public water supply systems. This does not include direct water withdrawals by industry for cooling purposes and other industrial uses.

The river has an average flow of 5,610 million gallons per day with a low flow of 317 million gallons per day.

There are more than 42,000 acres of water surface in the lakes and streams.

PENNSYLVANIA

Water usage is approximately 360 million gallons daily, not including direct withdrawals for industrial purposes or hydropower use. Public systems provide more than 50 percent of the water used.

Agricultural water use becomes significant in certain areas of the Basin when demands for irrigation become heavy.

One of the most complex pollution problems is caused by mine acid. More than 1,000 miles of the river system are affected by mine acid from both deepmine and strip mining operations.

The river has an average flow of 19,665 million gallons daily with a low flow of 1,595 million gallons daily recorded at its lower end.

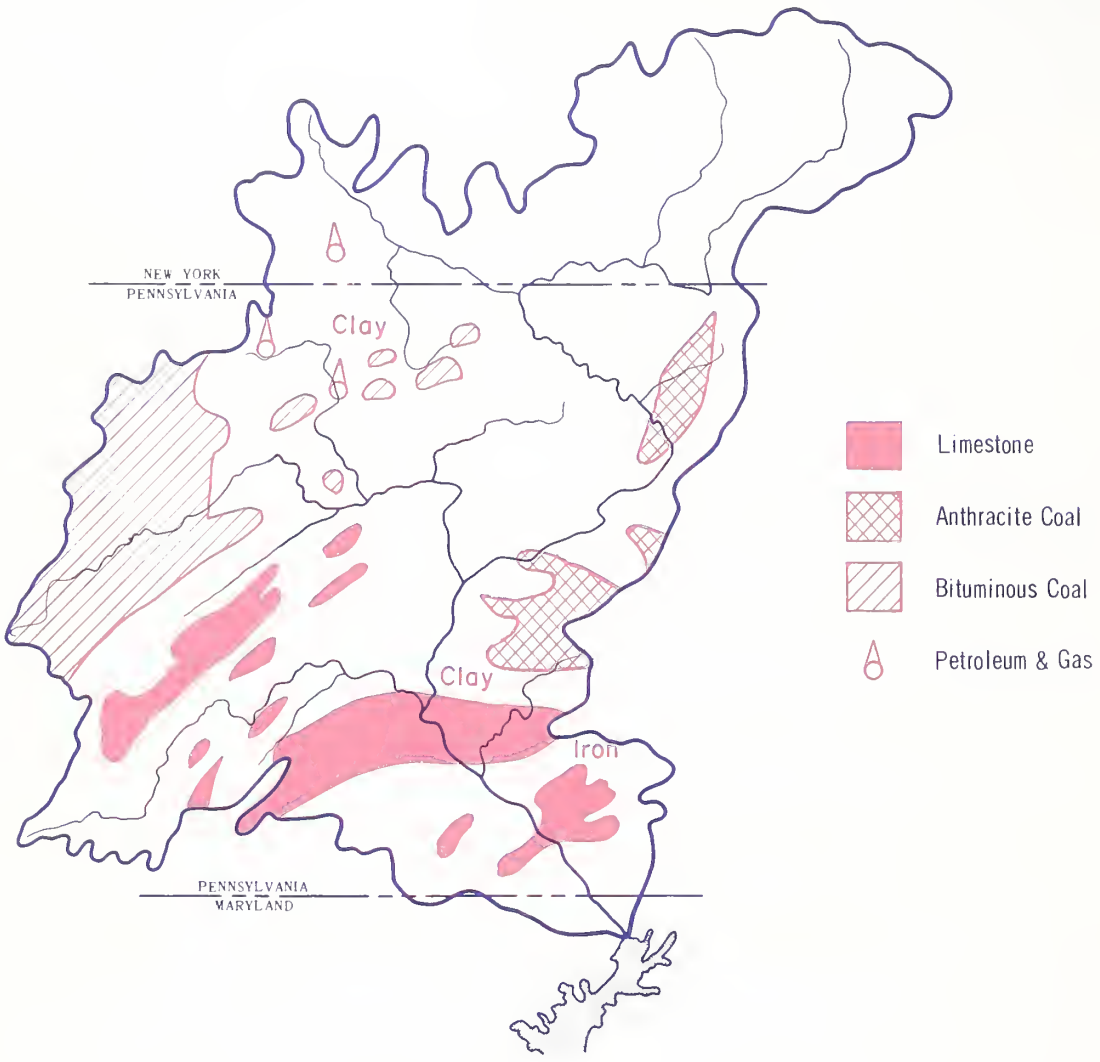
There are about 148,000 acres of surface water in the streams and lakes.

MARYLAND

Maryland has a great interest in the quality and quantity of water in the lower portion of the Basin. Baltimore has recently completed transmission facilities which will allow the city to take 150 million gallons daily from the river.

The Basin has a significant effect on the fishing and recreation industry in the upper Chesapeake Bay. The amount of water leaving the river determines to a great extent the saline content of the Bay which affects both the sport and commercial fishery resources.

The amount of water flowing in the lower main stem is important in the production of hydropower. The 42,000 million gallons daily flow needed to operate the hydropower facilities at maximum capacity is available for only a short time each year.


NEW YORK
PENNSYLVANIA
Clay
Clay
Iron
PENNSYLVANIA
MARYLAND
Limestone
Anthracite Coal
Bituminous Coal
Petroleum & Gas

In 1962, production of non-metallic minerals, metallic ores and fuels in the Basin was valued at 215 million dollars. More than 3,000 operations employed 21,000 men in the production of minerals, with an additional 55,000 men employed in the processing of minerals.

NEW YORK:

Sand and gravel from galcial sources are abundant throughout the upper Basin and are being utilized to meet many types of construction needs.

Limestones are uncommon, occuring only in the northern extremities. Sandstone, building stone and clay from glacial clays and shales are available throughout the area. The availability of ground water is closely connected to the geologic characteristics of the Basin. A small amount of oil is produced in the northwestern portion of the Basin.

PENNSYLVANIA:

The mineral resources of the Basin are important to the state's economy. The Wilkes-Barre - Scranton area contains some of the most important anthracite coal deposits in the nation. In 1962, annual production in the Basin was approximately 10 million tons.

Bituminous coal is found throughout many of the western and central portions of the Basin. About 10 million tons of bituminous coal are mined in the Basin annually.

Petroleum and natural gas production is concentrated in a few counties in the western portion. Annual oil and gas production is valued at approximately $8 million.

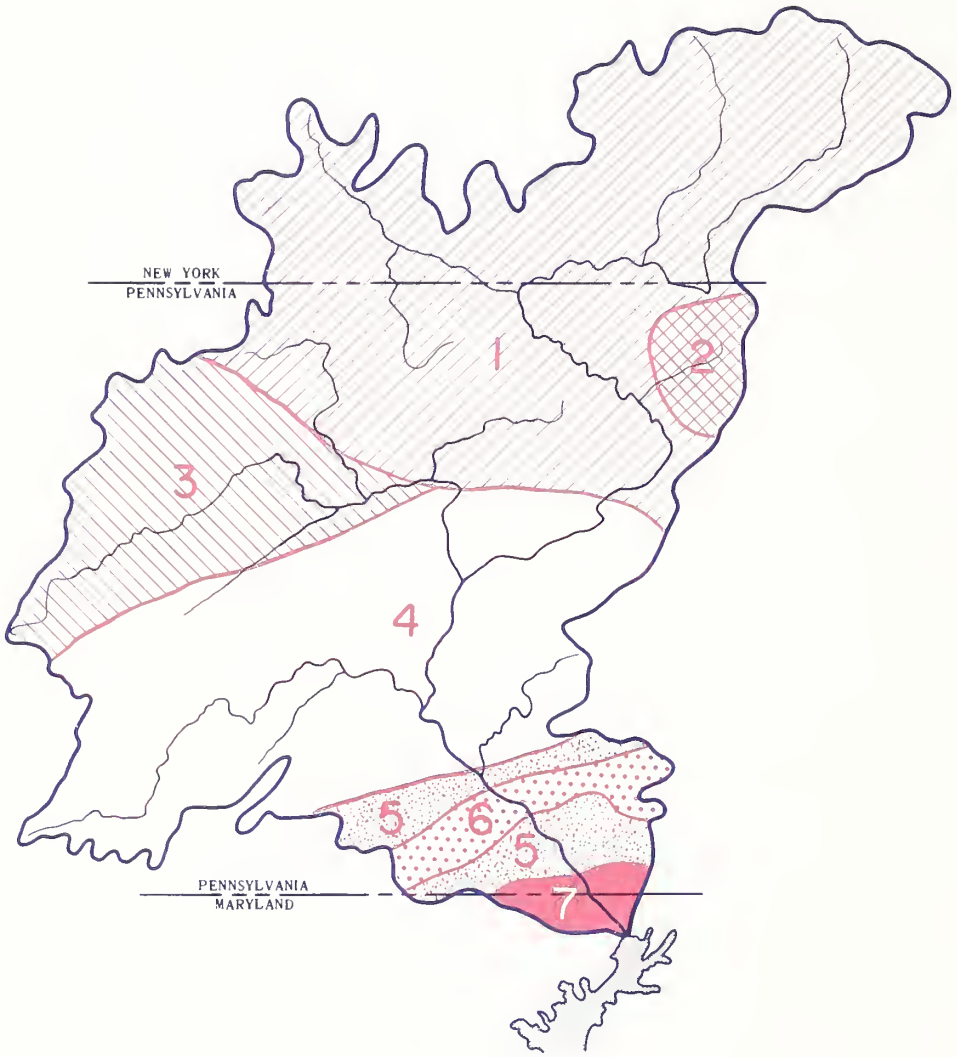
Limestone is an important mineral in the Basin because of its widespread distribution close to markets and its use in industry, agriculture and construction. Its value of production places Pennsylvania high among all states in production of this extensively used mineral.

Other non-metallic minerals as clay, sand, and gravel are found throughout many areas of the Basin and have many industrial and construction uses.

Iron ore deposits are limited with mining currently restricted to Lebanon County.

MARYLAND:

Sand, gravel and building stone are the only minerals mined and are used almost entirely to meet local construction needs.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PENNSYLVANIA
MARYLAND

SOILS

The generalized map outlines the major groupings of soils throughout the Basin. Their broad characteristics and relationship to the landscape indicate their potential for agricultural, industrial, and commercial uses.

1. These soils are on the uplands of the glaciated Allegheny Plateau. Steep slopes and poor drainage are severe limitations in this area and limit agricultural use. Since liming, fertilization, and extensive conservation practices are essential for even moderate yields, agricultural costs of production are high.

2. This area on the eastern boundary of the glaciated Allegheny Plateau has a predominance of poorly drained and shallow soils. Most of the area is forested with only a small acreage under cultivation.

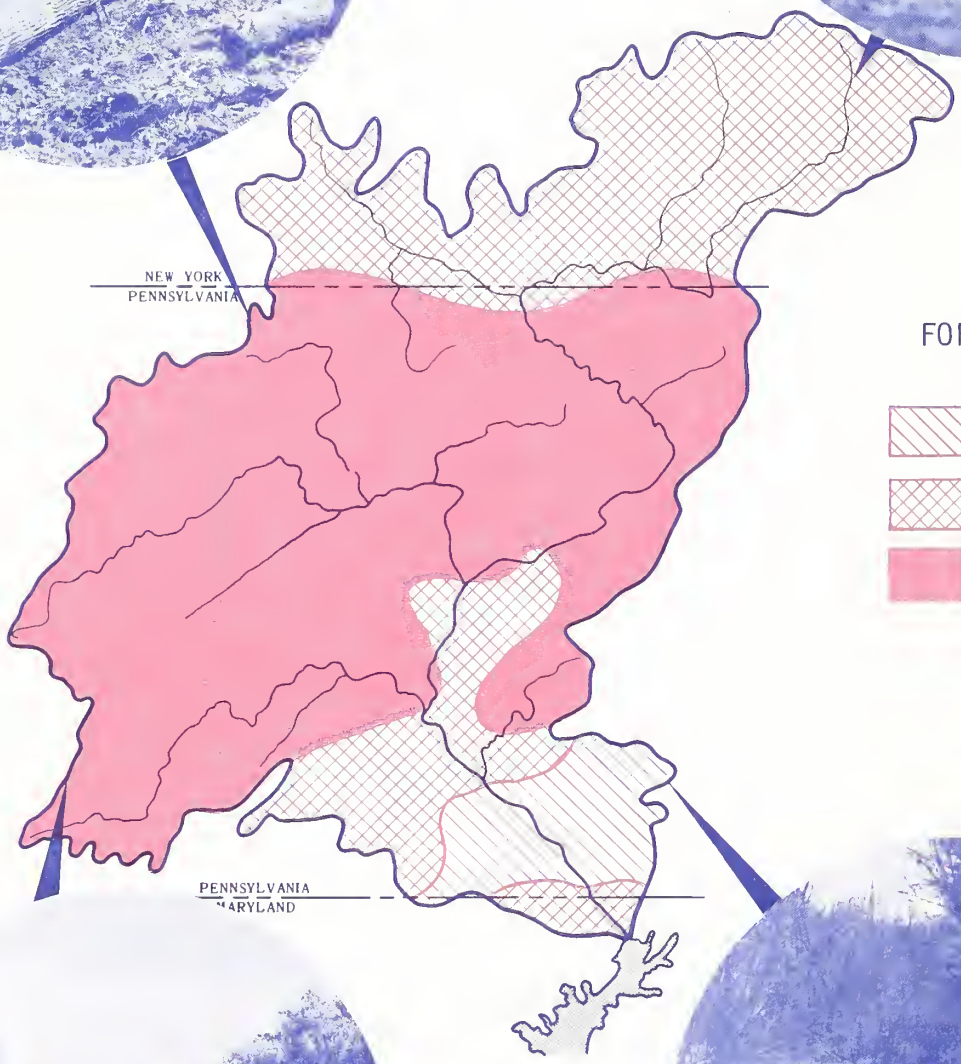
3. This area is in the unglaciated portion of the Allegheny Plateau. Soils are low in natural fertility and often stony. Steep slopes, stoniness, and wetness severely limit agricultural use. This area contains the highest percentage of woodland in the Basin, with farming limited to a few soils in the valley floor.

4. The largest area in the Basin lies in the Appalachian Ridge and Valley Province. A wide range of soils occurs here because of the many kinds of parent materials. There are two distinct groups of soils which are related to topography: the mountain soils, coarse textured and quite stony, have limited agricultural use; the valley soils include those formed from shale which because of their droughtiness and low moisture-holding capacity, are only fair for agricultural use, and the limestone valley soils which are generally deep and very productive. These limestone valleys have some of the most productive soils in the Basin.

5. These soils are in areas underlain by limestone in the Great Valley along the eastern side of the Ridge and Valley Province and the Piedmont Province. They are deep, well drained, fertile soils with a high moisture-holding capacity. This rather small area contains the most productive agricultural soils in the Basin. Most of the land has been cleared and is in cultivated crops with very few forested areas.

6. These soils are composed of sandstones and shales. The pattern of soils here is complicated but generally they are only moderately adapted to farm crops.

7. This is an area in the Piedmont Province which has deep, well drained soils and rolling topography. The soils are productive and most of the area has been cleared for cultivated crops. Erosion has been most severe in this area of the Basin.



FOREST DISTRIBUTION

0 – 25 Percent

25 – 50 Percent

50 – 100 Percent

FOREST RESOURCES

Forests occupy 54.9 percent (9,673,000 acres) of the total area of the Susquehanna River Basin. Because of their extent, their ability to produce recurrent supplies of raw material, their efficiency for stabilizing soil and regulating waterflow, their importance to outdoor recreation, and in furnishing preferred habitat for various species of wildlife, they remain one of the more important natural resources of the Basin.

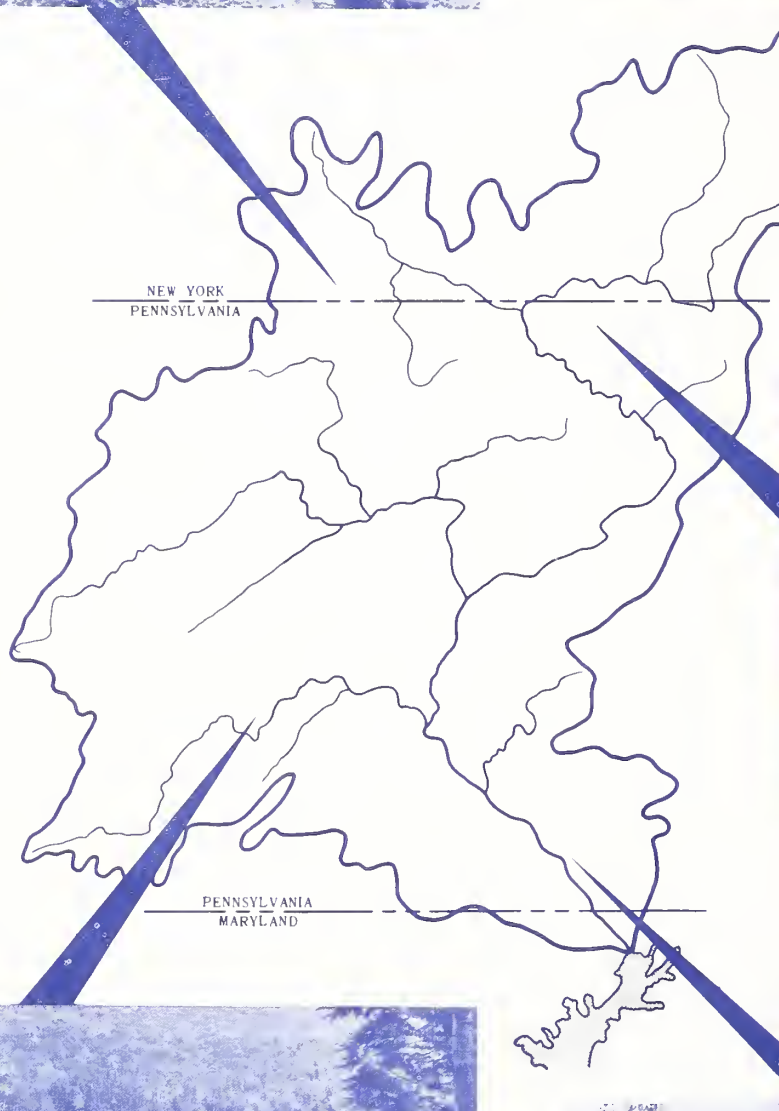
Seventy-seven percent of the forest land within the Basin is privately-owned. This land is held by a heterogeneous group, including wage earners, housewives, professional people, farmers, fish and game clubs, and an assortment of wood using and non-wood using business enterprises.

Twenty-three percent of the Basin's forest land is publicly-owned. Nearly all of this is made up of State forests and State game lands. These are administered by the appropriate branches of the State government.

From the standpoint of watershed protection, forests which in general were left on the thinnest soils and steepest slopes, unfit for cultivation, provide the most important soil cover in the Basin. Forest cover, with its ability to accept precipitation and create optimum conditions for storing water in the soil profile, offers maximum opportunities for the storage and gradual release of storm precipitation. It is effective in reducing peak runoff during and immediately after storms and in increasing the amount of water available for deep storage as ground water. Base flow from ground water is the primary source of domestic and industrial water during periods of low flow.

The treatment and management of the forests of the Basin will have pronounced effects on future water supplies, on flood hazard and sediment reduction, on availability of raw materials for forest industries, and on the use of forest land for outdoor recreation.

Based upon the preliminary estimate of the annual cut and use of timber products harvested within the Basin, it is estimated that their value would be $34,000,000 for the rough lumber and pulpwood at the mills. This provides employment and income for thousands of workers throughout the Basin.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PENNSYLVANIA
MARYLAND

RECREATION

The Basin has many areas where the combination of water, tree covered mountains, scenic beauty and historical background exists to permit development of an extensive recreational industry. Many areas have already taken advantage of this combination of natural resources to establish recreational facilities and service industries to serve the recreation trade. The Basin's location in relation to the population centers of the Atlantic Seaboard and its proposed highway program indicate that recreational use of its resources will greatly expand in the next few decades.

Private Role

The undeveloped potential of many acres of private lands provides unlimited opportunities for many types of outdoor recreation. More people, higher incomes, more leisure time, and greater mobility make it certain that more development, improvement, conservation, and utilization of the Basin's natural resources will be needed to provide recreational opportunities. Planned land use will prevent development of unsightly areas and unprofitable recreational enterprises. The service industry which will develop in conjunction with the recreational use of the land and water resources can make a significant contribution to the Basin's economy.

Public Role

Public ownership of lands set aside to provide outdoor recreational opportunities is significant. The majority of public-owned lands is under state ownership. These lands include:

New York

Total lands in state and municipal ownership available for recreation is 232,000 acres. These include state parks, forest lands, fish and gamelands, fishing rights and stream improvement areas, boat launching sites, and 18 local municipal parks. Additional acquisition is planned under a state-wide park and recreation land acquisition program now under way.

Pennsylvania

Diverse forms of recreation are provided throughout the Basin in state forest lands, parks, gamelands, and wildlife areas. More than 2,178,000 acres of land under state ownership provide outdoor recreation opportunities. Much of this land is in the mountainous areas of the northwestern portion of the Basin with very little publicly-owned land in the mining, industrial, and agricultural regions of the eastern and southern portions of the Basin. The recently authorized "Project 70" program will provide opportunities for an expansion program of parks and recreation.

Maryland

Two state parks are located in the Basin, one of which is in the development stage. Currently public ownership of recreational lands is approximately 630 acres.

STATUS OF WATERSHED PROJECTS

Active Application

Authorized for Planning

Under Construction

PL 566 PROJECTS

Many communities in the Basin have taken steps to eliminate their flooding problems and meet their water resource needs through the Public Law 566, Watershed and Flood Protection Program. Since 1954 this act has made it possible for local sponsors of watershed projects to receive technical and financial assistance from the Soil Conservation Service.

The watershed plans which have been developed include the acceleration of land treatment measures to adequately protect the cropland, grasslands, and forests of the Basin. In addition to reducing sediment and runoff from the drainage area of the Basin, the land treatment program will result in making the watershed areas better places to live and work.

The P. L. 566 program has resulted in not only providing flood control to affected communities but includes dams built for municipal water supply, recreation and fish and wildlife development, waterfowl areas and agricultural drainage and irrigation projects.

NEW YORK:

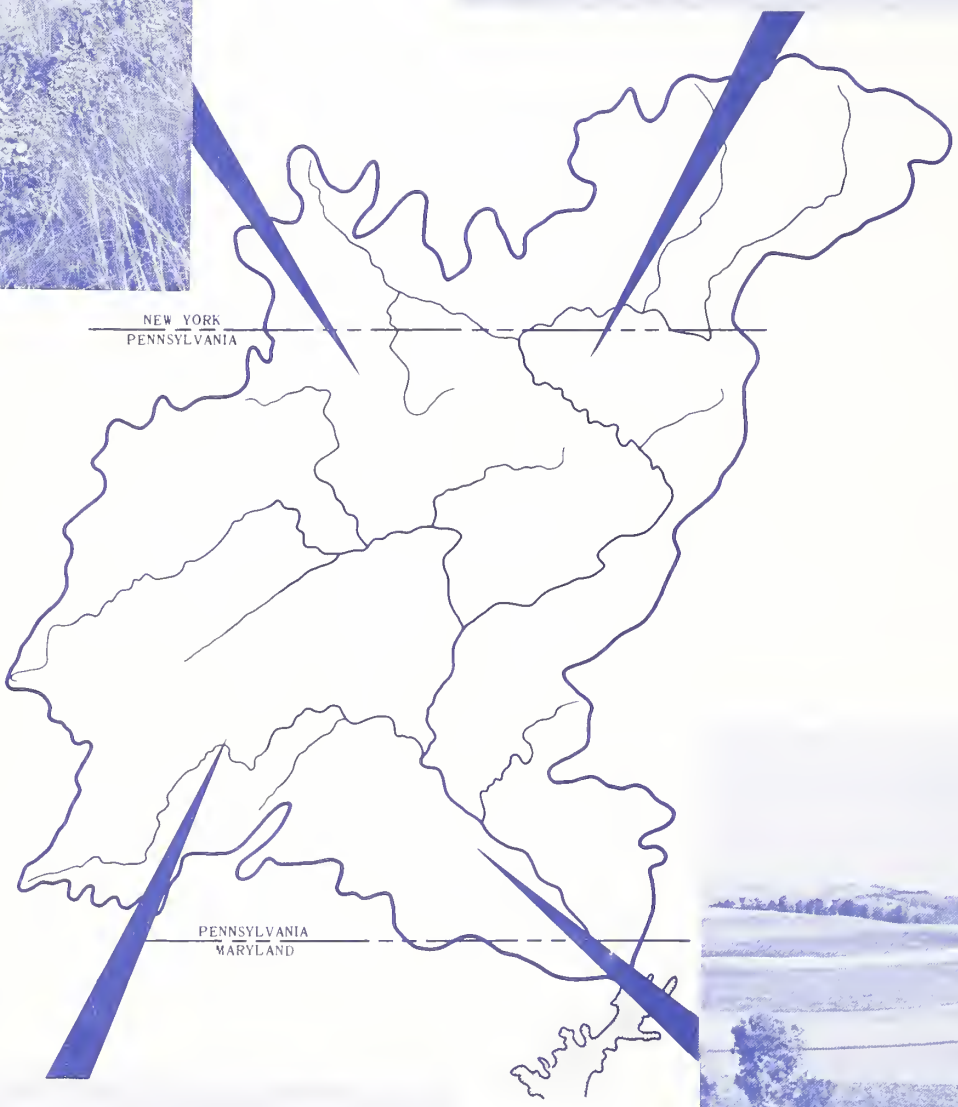
Seven watershed plans have been developed. These watersheds cover an area of 340 square miles. Twenty-four dams have been authorized for construction with two of them built. The average annual flood control benefits accruing are $153,000. In addition local interests in six other watersheds have taken steps to initiate watershed planning under Public Law 566.

PENNSYLVANIA:

Seven watershed plans covering an area of 332 square miles have been developed. Six of the fourteen dams planned have been constructed. The average annual flood control benefits accruing to these projects are $248,000. In addition, local interests in three other watersheds have submitted applications requesting planning assistance while groups in many areas have indicated a desire to meet their water resource needs through the P. L. 566 program.

MARYLAND:

One of the first watershed plans developed was on Little Deer Creek watershed. Three of the four dams proposed on this agricultural watershed have been constructed.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PENNSYLVANIA
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MARYLAND

Meeting the Public

A policy of meeting with the people who live in the Basin was initiated at the outset of the study. To date, 14 meetings have been held in those areas of the Basin where field studies are under way.

In 1965 more than 60 groups representing agriculture, industry and business were acquainted with the role of the Department of Agriculture in the study and its objectives. This policy will continue so that local interest are kept informed, and have an opportunity to contribute to the study.

Watershed Inventory

The Basin has been divided into 89 tributary watersheds which are being studied in an independent yet coordinated approach. An integrated tributary approach which blankets the Basin will result in a comprehensive plan that meets all feasible upstream needs, and will also help to meet many of the downstream needs.

Accomplishments

The agricultural and forestry portion of the economic base study has been completed. This study will serve as a basis for development of the water and related land resources to meet future needs.

Inventory information has been collected in 60 percent of the watersheds of the Basin. This includes location and extent of floodwater, erosion and sediment damages in tributary watersheds, determination of land use throughout the Basin, and location of water storage potentials for meeting upstream needs.

Evaluation of agricultural water needs. - An inventory of present irrigation needs and future demands is under way. Use of water for various purposes will be competitive in certain areas of the Basin in the future. The extent of agriculture's needs for water must be known.

Types of programs needed to reduce or eliminate flood and sediment damages, meet water supply needs and provide for water-oriented recreation are being studied in all tributary watersheds.

SOIL AND WATER CONSERVATION DISTRICTS

Soil and Water Conservation Districts have played a prominent role in the wise use and development of the natural resources of the Basin. Soil and Water Conservation Districts have been organized in all except two of the 66 counties that are completely or partially within the Basin's boundaries.

The accomplishments of the landowners in establishing conservation measures have been significant. Major accomplishments include:

	Unit	Total
District Cooperators	No.	24,170
Conservation Plans	No.	18,370
Strip Cropping	Ac.	411,200
Diversions	Mi.	4,120
Grassland Improvement	Ac.	358,400
Tree Planting	Ac.	174,680
Ponds	No.	6,340

Today Soil and Water Conservation Districts are re-evaluating their role in resource conservation. Most of the districts are carrying out an inventory of their soil, water, woodland, and wildlife resources so that long range plans for the use of these resources can be developed. These plans can serve as a base for sound land use planning for both rural and urban areas.

Districts are also planning to carry out their programs through resource conservation and development projects. Two applications have been submitted to the U.S. Department of Agriculture requesting that Resource Conservation and Development projects be approved in the five-county Endless Mountain Area in the northern part of Pennsylvania and a four-county area including Northumberland, Dauphin, Lebanon, and Schuylkill counties in south central Pennsylvania. There is also active interest in this type of resource area planning in New York.

Conservation leadership at the local level is assured through the Soil and Water Conservation District program. This leadership can serve as the voice of the farmers and other landowners who own almost 80 percent of the land in the Basin. The success in formulation and the implementation of a comprehensive coordinated plan depends on the understanding and acceptance of the plan by all of the Basin's citizens.

The farmers and other landowners in the Basin have a big stake in the study now underway. Their interests should be recognized and they should be kept fully informed of the study activities. The Department of Agriculture believes a truly comprehensive, coordinated plan which will meet agriculture's needs should fully recognize and include the following:

1. Optimum development of agricultural and forestry potential of the Basin to help meet the nation's needs. This potential, to be based on utilization of soils and other applicable resource information, should be sufficiently outlined to permit its use as a basis for long range agricultural planning.

2. Locate and study all feasible tributary watershed storage sites to meet upstream needs and help meet downstream needs. The information should be developed so that it can be used by all public agencies and by private investors.

3. A complete inventory of land treatment needs with a plan for accelerating this program with emphasis on strip mine reclamation.

4. Recreation potential of both private and public lands in upstream areas should be recognized and full economic impact of their use should be studied.

5. Meeting water resource needs through full use of Public Law 566 opportunities.

6. Maximum pollution control to include land treatment on strip mined areas and storage of water in upstream areas for low flow augmentation.

7. Thorough analysis of agricultural and rural water needs so that they are recognized and allocations to meet those needs are set forth in the plan.

USDA-SCS-HYATTSVILLE, MD. 1965